Appendix 1: Evaluation of AOCs & Remedial Action Selection

Remedial Alternative	Protection of Human Health and the environment	Short-term effectiveness	Long-term effectiveness	Implementability	Cost
AOC 1: Contaminated Soil					
Stabilization	eliminates threat to human health & environment	Effective	Effective	Requires gw monitoring for an extended period of time to ensure leaching of contaminants into groundwater does not occur	
No further action	disregards impact to the environment	Not effective	Not effective	Easy to implement	$0
excavation & backfill	eliminates threat to human health & environment	Effective	Effective	Easy to implement	$273,000 (avg)
AOC 1: Sumps and Nearby Soil					
No further action	Would not protect from further impact to the environment	Not effective	Not effective	Easy to implement	$0.00
Excavation of sumps and nearby soils	Removal of the soil will prevent further contamination of the environment, it will prevent contact with the material by humans and animals	Effective	Effective	Will need vacuum truck, pressure washer	$144,000 (avg)
AOC 3: ACM					
No further action	not protective of human health	Not effective	Not effective	Easy to implement	$0.00
Removal of floor tiles, mastics, and transit boards	eliminates threat to human health	Effective	Effective	Removal should be done by a liscenced Asbestos Abatement Company	$7,500
AOC 4: Site Structures					
No further action	Would not protect from further impact to the environment	Not effective	Not effective	Easy to implement	$0.00
cleaning walls & remaining equipment, applying sealant to concrete slab	Allows monitoring to ensure degradation is occurring; sealant will stabilize any chemicals in the concrete slab, thus eliminating the threat of migration to soil	Effective	Effective	Requires monitoring every 5 years to ensure effectiveness	$41,000 + 16k/yr for 5 years = $121,000
Demolish building and concrete slab, backfill with clean material	elimination of source contamination, no continued monitoring necessary	Effective	Effective	Demolition equipment	$2,570,000 (avg)
AOC 5: Groundwater Contamination					
No further action	contaminated groundwater could possibly move off-site and be exposed to the WFWR.	Not effective	Not effective	Easy to implement	$36,000 per year
Groundwater Monitoring system	Allows monitoring to ensure contamination remains on-site and degradation is occurring	Effective	Effective:	A deed restriction for gw use beneath the site; annual monitoring for 5 years	$16,000 per year for 5 years = $80,000

Table 1: chemicals of potential concern in groundwater

Beryllium	Cadmium	Chromium
Iron	Manganese	Nickel
Vanadium	Benzene	Bromodichloromethane
sec-Butylbenzene	tert-Butylbenzene	Chloroethane (ethyl chloride)
Dibromochloromethane	1,1-Dichloroethane	1,2-Dichloroethane
DCE	cis 1,2-Dichloroethene	1,4-Dioxane
1,2,4-Trichlorobenzene	TCA	1,1,2-Trichloroethane
1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Trichloroethene
Vinyl Chloride	m & p Xylene	bis(2-ethylhexyl)phthalate

icals of potential concern in surface and

Non-Hot Spot Areas	**Hot Spot Area**
Cadmium	Cadmium
Chromium	Chromium
Nickel	Copper
	Lead
	Nickel
	Zinc

s in surface water and sedime

Surface Water	**Sediment**
Aluminum	Arsenic
	Chromium
	Nickel
	Vanadium
	Zinc

Table ??. Copcs in the concrete slab

Sample No.	Depth	Arsenic mg/kg	Chromium mg/kg	Nickel mg/kg
CB03	0-1 in.	34.3	8170	1380
CB04	0-1 in.	<5	380	1650
CB05	0-1 in.	<5	1210	567
CB06	0-1 in.	<5	1.5	21
Residential HHMSSL, 0-6"		0.39	210	1600
Industrial HHMSSL (w/o dermal)		3.8	450	41000
Industrial HHMSSL		1.8	500	23000

Table ??. Chemicals of Potential Concern in fish

Chemical	Maximum Detect (mg/kg)
Barium	3.8
Cobalt	0.96
Iron	8.58
Magnesium	287
Manganese	0.289
Nickel	0.757
Zinc	4.64

Soil excavation

table 3.1

Activity	Hazardous Disposal	Non-Hazardous Disposal
Excavation of contaminated soils[1]	$2,000	$2,000
Verification Sampling[2]	$6,000	$6,000
Waste Profiling Sampling[3]	$3,000	$3,000
Backfilling excavated areas[4]	$3,000	$3,000
Transportation[5]	$32,000	$5,000
Disposal[6]	$240,000	$17,000
10% Contingency	$29,000	$4,000
Estimated Total	**$315,000**	**$40,000**

revision 01

Activity	Hazardous Disposal	Non-Hazardous Disposal
initial waste profiling	$2,500	$2,500
Excavation of contaminated soils[1]	$2,000	$2,000
Verification Sampling[2]	$6,000	$6,000
Waste Profiling Sampling[3]	$3,000	$3,000
Backfilling excavated areas[4]	$3,000	$3,000
Transportation[5]	$32,000	$5,000
Disposal[6]	$240,000	$17,000
10% Contingency	$29,000	$4,000
Estimated Total	**$317,500**	**$42,500**

soil stabilization

table 3.2

Activity	Onsite Disposal	Offsite Disposal
Excavation of contaminated soils[1]	$2,000	$3,000
Verification Sampling[2]	$6,000	$6,000
Soil Stabilization[3]	$45,000	$45,000
Waste Profile Sampling[4]	$3,000	$3,000
Backfilling excavated areas[5]	$2,000	$3,000
Transportation[6]	NA	$5,000
Disposal[6]	NA	$19,000
10% Contingency	$6,000	$8,000
Estimated Total	**$64,000**	**$92,000**

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Activity	Onsite Disposal	Offsite Disposal
initial waste profiling	$2,500	$2,500
Excavation of contaminated soils[1]	$2,000	$2,000
Verification Sampling[2]	$6,000	$6,000
Soil Stabilization[3]	$45,000	$45,000
Waste Profile Sampling[4]	$3,000	$3,000
Backfilling excavated areas[5]	$3,000	$3,000
Transportation[6]	NA	$5,000
Disposal[6]	NA	$19,000
10% Contingency	$6,000	$8,000
Estimated Total	**$67,500**	**$93,500**

85500 61500
8550 6150
94050

bulding sumps

table 3.3.

Activity	Hazardous Disposal	Non-Hazardous Disposal
Excavation of contaminated soils[1]	$2,000	$2,000
Verification Sampling[2]	$9,000	$9,000
Waste Profile Sampling[3]	$3,000	$3,000
Backfilling excavated areas[4]	$10,000	$10,000
Transportation[5]	$28,000	$4,000
Disposal[6]	$167,000	$15,000
10% Contingency	$22,000	$4,000
Estimated Total	**$241,000**	**$47,000**

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Activity	Hazardous Disposal	Non-Hazardous Disposal
initial waste profiling	$2,500	$2,500
Excavation of contaminated soils[1]	$2,000	$2,000
Verification Sampling[2]	$9,000	$9,000
Waste Profile Sampling[3]	$3,000	$3,000
Backfilling excavated areas[4]	$10,000	$10,000
Transportation[5]	$28,000	$4,000
Disposal[6]	$167,000	$15,000
10% Contingency	$22,000	$4,000
Estimated Total	**$243,500**	**$49,500**

R&P Building

table 3.4

Remediation	Estimated Cost
Clean building walls and concrete floors, seal concrete floors [1]	$41,000
Demolish, transport, and dispose of buildings and concrete slabs; backfill with clean fill	
All non-hazardous disposal [2]	$1,407,000
50% non-hazardous disposal and 50% hazardous disposal [3]	$3,700,000

table 3.5

Area of Concern	Proposed Remedial Action	Estimated Cost	
		Minimal Cost	Maximum Cost
AOC 1: Contaminated Soils	Excavation and offsite disposal Non-hazardous disposal	$63,000	$483,000
	Onsite disposal Offsite disposal	$104,000	$145,000
AOC 2: Building Sumps	Non-hazardous disposal Hazardous disposal	$47,000	$241,000
AOC 3: ACM	Abatement and offsite disposal	$500	$500
AOC 4: Site Structures	Clean and seal	$41,000	$41,000
	Demolish and offsite disposal	$1,407,000	$1,407,000
AOC 5: Groundwater	Monitor for 5 year period	$80,000	$80,000
Total Estimated Remedial Cost		**$231,500**	**$2,211,500**

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Area of Concern	Proposed Remedial Action	Estimated Cost		
		Minimal Cost	Maximum Cost	avg
AOC 1: Contaminated Soils	No Further Action (NFA)	$0	$0	
	Excavation and offsite disposal	$63,000	$483,000	$273,000
	Onsite Stabilization of soils	$104,000	$145,000	$124,500
AOC 2: Building Sumps	NFA	$0	$0	
	Clean, offsite disposal, and backfill	$47,000	$241,000	$144,000
AOC 3: ACM	NFA	$0	$0	
	Removal of ACM	$7,500	$7,500	
AOC 4: Site Structures	NFA	$0	$0	
	Clean and seal	$41,000	$41,000	
	Demolish and offsite disposal	$1,407,000	$1,407,000	
AOC 5: Groundwater	NFA	$0	$0	
	Monitor for 5 year period	$80,000	$80,000	$16,000
Total Estimated Remedial Cost		**$0**	**$2,218,500**	

Total estimated $$$$$$$$

revison 02

Area of Concern	Proposed Remedial Action	Estimated Cost		
		Minimal Cost	Maximum Cost	
AOC 1: Contaminated Soils	No Further Action (NFA)	$0	$0	
	Excavation and offsite disposal	$42,500	$317,500	
	Onsite Stabilization of soils	$66,500	$94,500	
AOC 2: Building Sumps	NFA	$0	$0	
	Clean, offsite disposal, and backfill	$49,500	$243,500	
AOC 3: ACM	NFA	$0	$0	
	Removal of ACM	$7,000	$7,000	
AOC 4: Site Structures	NFA	$0	$0	
	Clean and seal	$41,000	$41,000	
	Demolish and offsite disposal	$1,407,000	$3,700,000	
AOC 5: Groundwater	NFA	$0	$0	
	Monitor for 5 year period	$80,000	$80,000	
Total Estimated Remedial Cost		**$0**	**$4,348,000**	**$0**

AOC	Remedial Alternative chosen
AOC 1: Contaminated Soil	excavation, removal, & backfill
AOC 2: Building Sumps	Excavation of sumps and nearby soils
AOC 3: ACM	Removal of floor tiles, mastics, and transit boards
AOC 4: Site Structures	Demolish building and concrete slab, backfill with clean material
AOC 5: Groundwater Contamination	Groundwater Monitoring system